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A 40-CENTIMETER TROCHOIDAL-TYPE MASS SPECTROMETER: TROCHOTRON

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A 40-CENTIMETER TROCHOIDAL-TYPE MASS SPECTROMETER: TROCHOTRON

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A large mass spectrometer in which the ion paths are prolate trochoids has been built, following the design principle of Bleakney and Hipple,* and has been in operation for several months. This "trochotron" uses the theoretically perfect double-focussing properties of crossed uniform electric and magnetic fields. The distance between the source and receiver slits in the grounded plate is 40 cm, while in most other particulars the construction is similar to the prolate instrument described by Bleakney and Hipple. An all-metal vacuum system is employed. An internal voltage divider is used for the aluminum "picture frames" that establish the electrostatic field.

Operation with collector currents as high as 0.3 microampere has been entirely satisfactory for masses up to Ce 140, which was the heaviest element studied extensively. The resolution is approximately one-half the value expected from geometrical consideration using slits 0.020 inch wide and 3 inches long.

Modifications of the apparatus are to be used in separation of stable isotopes in pure microgram quantities and isotopic analysis.

The original instrument was designed and constructed under the direction of W. A. Arnold, J. D. Trimmer, and H. W. Savage.

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* Bleakney and Hipple, Phys. Rev. 53, 521 (1938).